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MBAH 454

Sl.No. : 0397

**II Semester M.B.A. Degree Examination, May 2018**

**BUSINESS ADMINISTRATION**

**Operations Research**

Time : 3 Hours

Max. Marks : 70

**SECTION - A**  
**(Compulsory)**

Note : Answer any two questions. Each question carries ten marks. Answer to the question should not exceed five pages. (2 × 10 = 20)

Q1) Explain the role of operations research in decision making.

Q2) Describe the basic structure of queuing system.

Q3) Discuss the Monte Carlo method of solving a problem, illustrating it by outlining a procedure to solve a specified problem of your choice.

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**SECTION - B**

Note : Answer any three questions. Each question carries twelve marks. Answer to the question should not exceed six pages. (3 × 12 = 36)

Q4) Solve the following L.P.P. using graphical method.

$$\text{Maximise } Z = 7X_1 + 14X_2$$

Subject to the constraints

$$3X_1 + 2X_2 \leq 36$$

$$X_1 + 4X_2 \leq 10$$

$$X_1, X_2 \geq 0.$$

Q5) A company has four factories manufacturing the same commodity, which are required to be transported to meet the demands in four warehouses. The supplies and demands as also the cost per transportation from factory to warehouse in rupees per unit of product are given in the following table:

Factory	Warehouses				Supply (units)
	X	Y	Z	W	
A	25	55	40	60	60
B	35	30	50	40	140
C	36	45	26	66	150
D	35	30	41	50	50
Demand (units)	90	100	120	140	

Derive an optimal strategy of transportation of goods from factories to warehouses and assess the optimal cost.

Q6) The arrival of aircraft at an international airport tends to follow a Poisson fashion, in spite of schedule flight time, due to high operating variability in the schedule time. It can be assumed that the aircraft arrives at an average rate of 6/hr. The landing service is provided through a single runway by a control tower according to ED with an average service time of 6 mins/flight:

- Find the probability that will be more than 10 mins all together to wait for landing and to land an aircraft.
- What is probability that the runway will be free for an incoming flight?

Q7) A marketing manager has five salesmen and five sales districts. He estimates that the sales per month (in hundred rupees) would be as follows:

Salesmen	Districts				
	A	B	C	D	E
1	32	38	40	28	40
2	40	24	28	21	36
3	41	27	33	30	37
4	22	38	41	36	36
5	29	33	40	35	39

Find the assignment of salesmen to districts that will result in maximum sales.

Q8) A fleet owner finds from his past experience records that the cost of the machine is Rs.8000/- and the running cost are given below. At what age the replacement is due:-

Year	1	2	3	4	5	6	7	8
Maintenance cost	1000	1200	1400	1800	2300	2800	3400	4000
Resale Value	3000	1500	750	375	200	200	200	200

**SECTION - C**  
**(Compulsory)**

Note : Answer to this question should not exceed six pages. (1 × 14 = 14)

Q9) A small projects time estimates are listed in the table.

Activity	Estimated Time Duration (Weeks)		
	Optimistic	Most Likely	Pessimistic
1 - 2	1	1	5
1 - 3	1	4	7
1 - 4	2	2	8
2 - 5	1	1	2
2 - 6	2	2	4
3 - 5	2	5	10
4 - 6	2	5	8
5 - 6	3	6	14

- a) Draw the network diagram of the activities in the project.
- b) Find the expected duration and variance of the activities.
- c) Find the expected duration of the project length.
- d) What is the probability that the project will be completed :
  - i) at least 4 weeks earlier than expected time?
  - ii) not more than 4 weeks later than expected time.

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